Conclusion.

- In an effort to check different options for future high rate TPC construction and utilization we proposed and tested both gas gain structures and gas mixtures. Our goal was to work "inside" of crucial for TPC parameters: Ions Back Flow, Energy resolution (dE/dX), Electron and Ion drift speed, electron diffusion (in E- and B-fields), and Stability. We concentrated on two possible options for the gain structure: 4GEMs and our original proposal MMG+2GEMs. We achieved simultaneously an ion back-flow below 0.3% (with 10–15% uncertainty) and an energy resolution better than 12% (with 3–5% uncertainty) for 55Fe X-rays at a gain of ≈2000 in a variety of gas mixtures. A few gas mixtures that we studied haven't been used for TPC so far, but look promising, and can be recommended for more tests.
- Additionally a possible instability (special for MMG) was investigated mainly from the HV PS timing reaction on a spark. It was demonstrated that the resistive protection layer on a pad / strip readout structure "reduces" recovery PS timing after spark to practical negligible value.
- The hybrid micro-pattern gas amplification stage allows for a TPC design that can operate in a continuous mode, and serves as a viable option to limit space charge distortions in high-rate TPCs, and guarantee that dE/dX, ionization cluster space reconstruction resolution, drift parameters and detector stability will not be compromised.

MMG+2 GEMs. Energy resolution vs. IBF for Ne+CH_4(10%)+ CF_4(5%)▲, and +CF_4(10%)■